

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
RICHMOND DIVISION

THE TRUSTEES OF COLUMBIA
UNIVERSITY IN THE CITY OF NEW
YORK,

Plaintiff

vs.

SYMANTEC CORPORATION,

Defendant

Civil Action No. 3:13-cv-00808-JRS

JURY TRIAL DEMANDED

**SYMANTEC CORPORATION'S MEMORANDUM IN SUPPORT OF
MOTION FOR JUDGMENT ON THE PLEADINGS
PURSUANT TO FED. R. CIV. P. 12(C) AND 35 U.S.C. § 101**

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Pursuant to Federal Rule of Civil Procedure 12(c), Defendant Symantec Corporation (“Symantec”) respectfully submits this memorandum in support of its motion for judgment on the pleadings that the asserted patent claims are invalid as a matter of law under 35 U.S.C. § 101.

I. INTRODUCTION

A patent may be obtained for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” 35 U.S.C. § 101. The Supreme Court has recognized that this provision contains an implicit exception that “[l]aws of nature, natural phenomena, and abstract ideas are not patentable.” *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012).

Courts determine whether a claim covers ineligible subject matter under § 101 through a two-step test. *Alice Corp Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347, 2355 (2014). At step one, courts “determine whether the claims at issue are directed to one of those patent-ineligible concepts.” *Id.* “The abstract ideas category embodies the longstanding rule that an idea of itself is not patentable.” *Id.* (quotations omitted). Under step two of *Alice*, a court needs to consider whether the elements of each claim, both individually and as an ordered combination, “‘transform the nature of the claim’ into a patent-eligible application.” *Alice*, 134 S. Ct. at 2355 quoting *Mayo*, 132 S. Ct. at 1297.

Evaluating the claims at issue with the relevant Supreme Court and Federal Circuit precedent demonstrates that the asserted claims fail this two-step test and are thus invalid. *See Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed. Cir. 2016) citing *Alice*, 134 S. Ct. at 2357.

The asserted claims generally recite identifying a “function call” made by a program as “anomalous.”¹ This is based on a comparison of the “function call” to a “model of function calls.” A function call is merely a type of statement within a program that invokes code within the program to perform a task. A “model of function calls” is a determination of what the various function calls normally do when invoked.

Each asserted claim includes three steps: (1) executing a program in an emulator (“Executing Step”); (2) comparing a function call made in the emulator to a model of function calls (“Comparing Step”); and (3) identifying the function call as anomalous based on the comparison (“Identifying Step”).

One example that would fall under the asserted claims is informative. A model of function calls made by a program could be developed that models a particular function call. This particular function call could transfer execution of the program to a certain area in memory. Once the model is made, the program is then executed in an emulator (the Executing Step), making a particular function call in the emulator. This function call is then compared to the model (Comparing Step). If that function call, for instance, transfers execution into an unusual or abnormal area of the program (as determined by a comparison with the model), the function call could be identified as anomalous (Identifying Step). Such behavior could indicate that the program had been compromised by an attacker or has suffered a bug.

Consistent with Federal Circuit precedent, the basic character of the asserted claims—comparing and identifying data—is drawn to an unpatentable abstract idea. Further, the result-

¹ The parties dispute the correct meaning for the term “anomalous.” Symantec contends that the term means “deviating from normal.” Columbia, on the other hand, contends that it means “[deviation/deviating] from a model of typical computer system usage.” To be clear, the construction of this term does not alter the analysis for patent eligibility because it does not alter the basic character of the claims nor does this term provide an inventive concept.

oriented, functional language of the asserted claims is a plain signal that the claims lack an inventive concept. Nothing in these claims restricts *how* the result is accomplished—they merely recite a comparison of a function call to a model and potentially identifying a function call as anomalous. The specification expressly states that any hardware and software can be used to accomplish the embodiments of the claims. The claims do not identify what criteria are used to determine whether a particular call is anomalous. The asserted claims are therefore not directed to patentable subject matter, and Symantec’s Motion for Judgment on the Pleadings should be granted.

II. STATEMENT OF FACTS

In its First Amended Complaint, Plaintiff The Trustees of Columbia University in the City of New York (“Columbia”) asserted U.S. Patent No. 8,074,115 (the “’115 patent”) and its continuation, U.S. Patent No. 8,601,322 (“the ’322 patent”) against Symantec. Dkt. 12. Both patents are titled “Methods, Media and Systems for Detecting Anomalous Program Executions.” ’322 patent, Abstract; ’115 patent, Abstract.²

The asserted patents state that “[a]pplications may terminate due to any number of threats [e.g. viruses, trojans], program errors, software faults, attacks, or any other suitable software failure.” ’322 patent at 1:24-26. “Regardless of whether an application is attacked ... or contains errors during operation, these software faults and failures result in illegal memory access errors, division by zero errors, buffer overflows attacks, etc.” *Id.* at 1:40-44. “These errors cause an application to terminate its execution or ‘crash.’” *Id.* at 1:44-45.

² The ’115 and ’322 patent share the same specification; for clarity, citations will refer to the ’322 patent unless otherwise noted.

Against this background, the asserted patents are directed to an “anomaly detector,” which first generates a model of normal program behavior and then during later processing, applies the model to detect deviations from normal program behavior. *Id.* at 3:50-56. These deviations or “anomalous program executions [] may be indicative of a malicious attack or program fault.” *Id.* at 3:13-15.

“Normal” function call behavior is modeled by executing part, or all, of the program using an emulator. *Id.* at 3:28-37. An emulator has been construed by the Court to refer to *any* software that, alone or in combination with hardware, can monitor and selectively execute certain parts, or all, of a program. Dkt. 123 at 2. The modeled information may include function names, function call arguments, and “other features associated with the data sent to or returned from the called function.” *Id.* at 3:39-45. The anomaly detector then compares subsequent function calls made by the program with the model to detect anomalous function calls. *Id.* at 3:50-56.

The patent specification provides no limits on the algorithm used to perform anomaly detection. “The anomaly detection algorithm being used may be, for example, a probabilistic anomaly detection (PAD) algorithm or a one class support vector machine (OCSVM), ... or **any other suitable algorithm.**” *Id.* at 3:16-19 (emphasis added).

Figure 8 is illustrative of the embodiments of the asserted claims. *Id.* at Fig 8. At step 802, “data [is] pushed onto the stack (*e.g.*, by using an emulator or by modifying a program), and ... a data record [is] provided to the anomaly detector for processing.” *Id.* at 3:46-50. The information on the stack relates to a function call made by the program. “In the detection mode, after a model has been computed, the anomaly detector can detect stacked function references as

anomalous at 806 by comparing those references to the model based on the training data at 804.” *Id.* at 3:52-56.

As described above, the asserted claims include steps of executing a program in an emulator (“Executing Step”); comparing a function call made in the emulator to a model of function calls (“Comparing Step”); and identifying the function call as anomalous based on the comparison (“Identifying Step”). *See* Ex. C at 3.

In the Executing Step, a program is executed using an “emulator,” which as mentioned above has been construed by the Court to refer to *any* software that, alone or in combination with hardware, can monitor and selectively execute certain parts, or all, of a program. Dkt. 123 at 2. In the Comparing Step, data is compared to a model of data. Any suitable algorithm can be used. ’322 patent at 3:16-19. Models can be “algorithmically combined with the older model using any of a variety of suitable means” and “two distinct models may be computed by two distinct instances of an application by two distinct devices.” *Id.* at 8:25-27, 42-44. Optionally, random model building can be controlled using a key “provided by a commercial off-the-shelf (COTS) software vendor or some other data providing ‘randomization.’” *Id.* at 7:7-10. In the Identifying Step, an anomaly is identified. Nothing in the claims specify what constitutes an anomaly. Members of a community running the same program or a selected portion of the program can be notified of the identified anomaly. Dkt. 123 at 2.

As a result of *Inter Partes* Review proceedings,³ claims 2, 9, 10, 12, 19, 20, 23, 30, 31, 33, 40, and 41 of the ’115 patent and claims 2, 8, 11, 17, 25, and 27 of the ’322 patent are the

³ Symantec filed IPR2015-00375 for the ’115 patent and IPR2015-00377 for the ’322 patent on December 5, 2014. The Final Written Decisions of these proceedings have been attached as Exhibits A and B respectively.

remaining asserted claims (collectively, “asserted claims”).⁴ For clarity, all independent claims of the ’115 patent have been found invalid.⁵

Claim 2 of the ’322 patent is a method claim representative of the purported invention and is set forth below. ’322 patent at 20:47-55. Claim 11 of the ’322 patent recites a non-transitory computer-readable medium performing claim 2 when executed, and Claim 27 recites a system with a processor that performs the method of Claim 2. *Id.* at 21:20-30; 22:38-48. This can be seen by the comparison chart below.

’322 patent Claim 2	’322 patent Claim 11	’322 patent Claim 27
2 [pre]. A method for detecting anomalous program executions, comprising:	11. [pre] A non-transitory computer-readable medium containing computer-executable instructions that, when executed by a processor, cause the processor to perform a method for detecting anomalous program executions, comprising:	27. [pre] A system for detecting anomalous program executions, comprising: [a] a processor that:
[a] executing at least a portion of a program in an emulator;	[a] executing at least a portion of a program in an emulator;	[b] executes at least a portion of a program in an emulator;
[b] comparing a function call made in the emulator to a model of function calls for the at least a portion of the program, wherein the model is a combined model created from at least two models created using different computers; and	[b] comparing a function call made in the emulator to a model of function calls for the at least a portion of the program, wherein the model is a combined model created from at least two models created using different computers;	[c] compares a function call made in the emulator to a model of function calls for the at least a portion of the program, wherein the model is a combined model created from at least two models created using different computers;

⁴ At the pleadings stage, the Court may take judicial notice of other proceedings. *VirtualAgility Inc. v. Salesforce.com, Inc.*, 759 F.3d 1307, 1312 (Fed. Cir. 2014); Fed. R. Evid. 201(b)(2).

⁵ For the Court’s convenience, Exhibit C attached to this motion includes a comparison of the claims that remain. *See* Ex. C at 1-2. The claims in *italics* are invalid and were found to be known in the prior art. *Id.*; Ex. A; Ex. B.

	and	and
[c] identifying the function call as anomalous based on the comparison.	[c] identifying the function call as anomalous based on the comparison	[d] identifies the function call as anomalous based on the comparison

Like Claim 2 of the '322 patent, dependent Claims 2, 12, 23, and 33 of the '115 patent disclose where “the model is a combined model created from at least two models created using different computers” (“combined model claims”).

Dependent claims within the '115 patent disclose addition trivial limitations such as notifying an application community (“application community claims”—dependent claims 2, 9, 10, 12, 19 and 20 of the '115 patent) and modifying a program to include indicators (“indicator claims”—dependent claims 23, 30, 31, 33, 40 and 41 of the '115 patent) although as further discussed below, these limitations do not change the basic character of the asserted claims.

Dependent Claims 9, 10, 19, 20, 30, 31, 40, 41 of the '115 patent and 8, 17, 25 of the '322 patent additionally recite a variation of “randomly selecting [[at least] a portion of] the model as to be used in the comparison [from a plurality of different models relating to the program]” (“random model claims”).

As with Claim 2 of the '322 patent, none of these dependent claims specify an algorithm to be used for anomaly detection nor do they recite specific hardware or software for performing the steps of the asserted claims. '322 patent at 3:16-19.

III. LEGAL STANDARD

A. Patent Eligibility

35 U.S.C. § 101 permits patenting of “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” 35 U.S.C. § 101. The Supreme Court has recognized, however, that certain exceptions are necessary to prohibit patenting of “[l]aws of nature, natural phenomena, and abstract ideas” because they “are

basic tools of scientific and technological work.” *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012).

In *Alice Corp Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014), the Supreme Court established a two-step test for determining whether a patent recites a patent-ineligible concept. *Alice*, 134 S. Ct. at 2355. The first step in this analysis requires the Court to “determine whether the claims . . . are directed to [a] patent-ineligible concept[],” such as an abstract idea. *Id.* The Court’s analysis should focus on the “concept embodied by the majority of the limitations,” rather than fixating on excess verbiage or implementation details recited in the claims. *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715 (Fed. Cir. 2014).

The second step in this analysis is “a search for an ‘inventive concept’” where the Court must ask “what else is there in the claims before us?” *Alice*, 134 S. Ct. at 2355. The Court must consider the additional claim elements beyond the abstract idea “individually” and “as an ordered combination.” *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1289-90 (Fed. Cir. 2018). These additional elements must supply an inventive concept that ensures the patent amounts to “significantly more” than a patent on the abstract idea itself. *BSG*, 899 F.3d at 1290. “Whether a combination of claim limitations supplies an inventive concept that renders a claim ‘significantly more’ than an abstract idea to which it is directed is a question of law.” *Id.*

“Underlying factual determinations may inform this legal determination.” *Id.* Merely reciting “well-understood, routine, conventional” activity does not supply an inventive concept. *Id.* It is not enough to disclose the improvement in the specification; instead, the Court’s task becomes to “analyze the asserted claims and determine whether *they capture these improvements.*” *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1369 (Fed. Cir. 2018) (emphasis added).

In other words, “[t]o save a patent at step two, an inventive concept must be evident in the claims.” *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1327 (Fed. Cir. 2017).

B. Motions to Dismiss Under Rule 12(c)

“To survive a motion to dismiss, a complaint must contain sufficient factual matter, accepted as true, to ‘state a claim to relief that is plausible on its face.’” *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009). A plausible claim for relief in a patent infringement case requires a valid patent. *Virginia Innovation Scis. Inc. v. Amazon.com, Inc.*, 227 F. Supp. 3d 582, 591 (E.D. Va. 2017)⁶. “[W]hen the basic character of the claimed subject matter is readily ascertainable from the face of the patent courts may determine patent-eligibility at the motion to dismiss phase.” *Id.* (quotations omitted). “The standard for Rule 12(c) motions is the same as applied to Rule 12(b)(6) motions” and may be filed “after the pleadings are closed—but early enough not to delay trial.” *CertusView Techs., LLC v. S & N Locating Servs., LLC*, 111 F. Supp. 3d 688, 703 (E.D. Va. 2015).⁷

IV. THE ASSERTED CLAIMS OF THE ’115 AND ’322 PATENTS ARE INVALID FOR LACK OF PATENTABLE SUBJECT MATTER

The asserted claims of the ’115 and ’322 patents are invalid under 35 U.S.C. § 101 because they are directed to an abstract idea and lack any inventive concept.⁸ These claims can, and should, be held unpatentable at the pleading stage. No further claim construction is needed to determine that the asserted claims are directed to unpatentable subject matter. The basic character of the claimed subject matter is readily apparent and any unresolved claim construction

⁶ *aff’d sub nom. Virginia Innovation Scis., Inc. v. HTC Corp.*, 718 F. App’x 988 (Fed. Cir. 2018) (internal quotations omitted).

⁷ *aff’d*, 695 F. App’x 574 (Fed. Cir. 2017).

⁸ The Court may further take judicial notice of the *Inter Partes* Review proceedings. *VirtualAgility Inc. v. Salesforce.com, Inc.*, 759 F.3d 1307, 1312 (Fed. Cir. 2014).

issues would not impact a validity determination under § 101. *See Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat. Ass'n*, 776 F.3d 1343, 1349 (Fed. Cir. 2014). Nothing in the specification can show that the functional language of the claims is drawn to anything other than the abstract idea of identifying a deviation in data. “Even if all the details contained in the specification were imported into the ... claims, the result would still not be a concrete implementation of the abstract idea.” *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1258 (Fed. Cir. 2016).

Further, there are no issues of fact to postpone a patent-eligibility analysis. The ’115 and ’322 patents establish that each and every one of its components, whether viewed alone or as an ordered combination, is nothing more than either generic hardware or a conventional step for performing a routine function. There is simply “no genuine issue of material fact regarding whether the claim element or claimed combination is well-understood, routine, [and] conventional to a skilled artisan in the relevant field,” and therefore, the asserted claims should be held unpatentable as a matter of law. *Berkheimer*, 881 F.3d at 1368.

Columbia **cannot** undue these admissions by pleading facts that are contrary to those established by the patents. *Massey v. Ojaniit*, 759 F.3d 343, 353 (4th Cir. 2014) (internal quotation omitted) (stating “we are not obliged to accept allegations that ... contradict matters properly subject to judicial notice or by exhibit”). Nor can Columbia establish patent-eligibility by pleading facts to show that the abstract idea to which the asserted claims are directed—identifying a deviation in data—is novel in view of the art. Even if the abstract idea were presumed to be novel, “a new abstract idea is still an abstract idea” and remains ineligible for patent protection. *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016).

A. The Asserted Claims are Directed to the Abstract Idea of Identifying a Deviation in Data.

The asserted claims are directed to comparing data to a model and identifying if the data deviates from that model. The Federal Circuit has repeatedly held variants of this notion to be unpatentable abstract ideas. *See Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016). The claimed invention can also be performed manually, further confirming the abstract nature of the claims. The asserted claims of '115 and '322 patents therefore fall squarely within the realm of unpatentable abstract ideas under step one of *Alice*.

1. The asserted claims are drawn to an unpatentable abstract idea.

The '115 and '322 patents take an abstract idea—identifying a deviation in data based on a comparison—and say nothing more than, “apply it.” This is plainly not patentable. The basic premise of the asserted claims is to compare a function call (data) to a model of function calls (model of data) and to potentially identify the function call as anomalous based on the comparison. A primary approach the Federal Circuit and Supreme Court have adopted to determine whether claims are abstract is by “compar[ing] claims at issue to those claims already found to be directed to an abstract idea in previous cases.” *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed. Cir. 2016) citing *Alice*, 134 S. Ct. at 2357. The Federal Circuit and multiple district courts have routinely held that claims drawn to this basic “compare-and-identify process” are directed to unpatentable abstract ideas and are therefore invalid.

In *Intellectual Ventures I LLC v. Erie Indem. Co.*, the Federal Circuit found claims unpatentable that recited “‘identifying and characterizing’ files based on one of three selection criteria.” 711 F. App'x 1012, 1015 (Fed. Cir. 2017). The claims at issue in *Erie* included steps of “[1] selecting a file ... [2] generating an identification value associated with the file ... [3] comparing the generated identification value to one more identification values associated with ...

unauthorized files; and [4] characterizing the file as an unauthorized file if the identification value matches one of the plurality of identification values associated with the unauthorized files.” *Id.* at 1014. The Federal Circuit concluded that “[t]aken together, the claims are directed to the **identification of unwanted files in a particular field** (i.e., a computer network) and otherwise concern data collection related to such identification, such that they are directed to an abstract idea under our precedent.” *Id.* at 1015 (emphasis added). Hence the Federal Circuit affirmed the district court’s finding that the patent was invalid under § 101. The Federal Circuit reasoned that the claims were directed to similar abstract ideas from its prior decisions in *Content Extraction*, *FairWarning IP*, and *Intellectual Ventures*. Like the claims in *Erie*, the claims at issue in each of these three decisions cited by *Erie* are also relevant to the patentability of the ’115 and ’322 asserted claims.

In *Content Extraction*, the claims at issue “generally recite[d] a method of 1) extracting data from hard copy documents using an automated digitizing unit such as a scanner, 2) recognizing specific information from the extracted data, and 3) storing that information in a memory.” 776 F.3d 1343, 1345 (Fed. Cir. 2014). “This method can be performed by software on an automated teller machine (ATM) that recognizes information written on a scanned check, such as the check’s amount, and populates certain data fields with that information in a computer’s memory.” *Id.* The Federal Circuit found that the claims were “drawn to the abstract idea of 1) collecting data, 2) **recognizing certain data within the collected data set**, and 3) storing that recognized data in a memory.” *Id.* at 1347 (emphasis added). Like the claims in *Content Extraction*, the asserted claims of the ’115 and ’322 patents are directed towards the same abstract concepts. In the Executing Step, data is collected (*e.g.*, function call information from a program). *See* ’322 patent at 3:40-45 (stating “one or more of the following may be

extracted from the program stack specific information: function name, the argument buffer name it may reference, and other features associated with the data sent to or returned from the called function (*e.g.*, the length in bytes of the data, or the memory location of the data”). And the Comparing and Identifying Steps are directed to “recognizing certain data within the collected data set.” *See id.* at 20:47-55 (claim 2) (emphasis added) (“comparing a function call made in the emulator to a model of function calls for the at least a portion of the program ... and **identifying the function call as anomalous based on the comparison**”). The abstract idea of identifying a deviation in data based on a comparison is no different than “recognizing certain data within the collected data set.” Hence like the claims in *Content Extraction*, the asserted claims are directed towards an abstract idea.

In *FairWarning IP*, the patent at issue recited a method that “collects information regarding accesses of a patient’s personal health information, analyzes the information according to one of several rules (*i.e.*, related to accesses in excess of a specific volume, accesses during a pre-determined time interval, or accesses by a specific user) to determine if the activity indicates improper access, and provides notification if it determines that improper access has occurred.” *FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1093 (Fed. Cir. 2016). The Federal Circuit found that these claims for “detecting fraud and/or misuse in a computer environment based on analyzing data” according to “one of several rules” were directed to an abstract idea and therefore unpatentable. *Id.* at 1093-1095. The Federal Circuit explained “that the ‘realm of abstract ideas’ includes ‘collecting information, including when limited to particular content’ and that “analyzing information by ... by mathematical algorithms, without more” is also within the abstract idea category. *Id.* at 1093 quoting *Elec. Power Grp*, 830 F.3d at 1353 (collecting cases). And further that “merely presenting the results of abstract processes of collecting and

analyzing information, without more (such as identifying a particular tool for presentation), is abstract as an ancillary part of such collection and analysis.” *Id.* at 1093. The Federal Circuit concluded that the “claims are directed to a combination of these abstract-idea categories.” *Id.* at 1094.

Here the asserted claims are in the same realm of abstract ideas as in *FairWarning IP*. The asserted claims collect information limited to a particular content (*e.g.*, function call related information in the Executing Step) and at most, compare and analyze that information. The use of an emulator for collecting function call related information is not an improvement in computers but rather the abstract idea of collecting information using computers. *Id.* at 1095. Not only is this demonstrated by the Court’s construction of an “emulator” but admitted by the patents themselves. Dkt. 123 at 2. For instance, the specification states that program stack information (*i.e.*, function call related information) may be extracted using Selective Transactional EMulation (STEM), a Valgrind emulator, “**or any other suitable technique.**” ’322 patent at 3:28-36 (emphasis added). The asserted patents do not claim to have invented an emulator nor is an emulator an inventive means for extracting function call information. *See Elec. Power Grp.*, 830 F.3d at 1354 (emphasis added) (stating claims that recite “a process of gathering and analyzing information of a specified content, then displaying the results, and **not any particular assertedly inventive technology for performing those functions....** are [] directed to an abstract idea”).

In the Comparing Step, a function call is compared to a model of function calls. The claims are not limited in how the comparison is performed or how the model of function calls is created for the program. For the claim element “model of function calls,” the specification states that “an anomaly detector models normal program execution stack behavior.” ’322 patent at

3:25-27 and 3:50-52. “The anomaly detection algorithm being used may be, for example, a probabilistic anomaly detection (PAD) algorithm or a one class support vector machine (OCSVM), ... or **any other suitable algorithm.**” *Id.* at 3:16-19 (emphasis added). Intrinsic evidence confirms that these approaches to anomaly detection existed well before the asserted patents were filed.⁹ Even if these claims were limited to the algorithms (PAD and OCSVM) disclosed in the specification—which they are not—the Supreme Court and Federal Circuit have repeatedly held that “analyzing information... by mathematical algorithms, without more” is within the realm of abstract ideas. *Elec. Power Grp.*, 830 F.3d at 1354 citing cases, including *Parker v. Flook*, 437 U.S. 584, 98 S. Ct. 2522 (1978), and *Gottschalk v. Benson*, 409 U.S. 63, 93 S. Ct. 253 (1972). Comparing function calls to a model is at most analyzing information—an abstract idea. Hence the asserted claims are no more than a combination of abstract ideas.¹⁰

Finally, in *Intellectual Ventures*, the claims recited “[a] method for identifying characteristics of data files, comprising ... receiving ... file content identifiers for data files ... determining ... whether each received content identifier matches a characteristic of other identifiers; and outputting ... an indication of the characteristic of the data file based on said step of determining.” *Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1313 (Fed. Cir.

⁹ See Ex. D, *Detecting Malicious Software by Monitoring Anomalous Windows Registry Accesses* [provisional application at 30 of the pdf], applying the approach described in reference 6, titled “Probabilistic anomaly detection over discrete records using inconsistency checks,” and dated 2002. See ‘322 Patent at 2 (dating the *Detecting Malicious Software by Monitoring Anomalous Windows Registry Accesses* paper to 2002).

¹⁰ See also *Power Analytics Corp. v. Operation Tech., Inc.*, 2017 WL 5468179, at *4 (C.D. Cal. July 13, 2017), *aff’d sub nom*, 748 F. App’x 334 (Fed. Cir. 2019) (emphasis added) (holding claims that used a virtual system modeling engine and an analytics engine ineligible, stating that “[d]espite their length and number, the asserted claims focus on gathering information, e.g., real-time and predicted data values, and analyzing and updating a model with that information, e.g., **comparing the gathered data and evaluating the prediction deviations to update the model**”).

2016). The Federal Circuit held “that receiving e-mail (and other data file) identifiers, characterizing e-mail based on the identifiers, and communicating the characterization—in other words, filtering files/e-mail—is an abstract idea.” *Id.* The Federal Circuit reasoned that people regularly discard mail based on its characteristics without opening it and that “[c]haracterizing e-mail based on a known list of identifiers is no less abstract.” *Id.* at 1314. The Federal Circuit further stated that the claims resembled those found to be abstract in *Content Extraction* in support of its conclusion. *Id.* at 1314-1315.

Here the asserted claims compare characteristics of function calls and identify the functional as anomalous based on the comparison. ’322 patent at 3:39-56. This is no different from the abstract concept claimed and rejected in *Intellectual Ventures*.

Based on these decisions, the asserted claims of the ’115 and ’322 patents fall squarely within the realm of unpatentable abstract ideas under step one of *Alice*. Claim limitation by claim limitation, it is clear that the asserted claims are merely a collection of abstract concepts (collect, compare, and identify data). *See* Ex. C at 3.

a. The remaining dependent claims are direct to abstract ideas as well.

The additional limitations found in the asserted claims are merely ancillary to the abstract idea of identifying deviations in data. For the combined model claims, none of the asserted claims specify **how** the combined model is created from at least two models created using different computers.¹¹ The specification states that models can be “**algorithmically combined** with the older model using **any of a variety of suitable means**” and that “two distinct models may be computed by two distinct instances of an application by two distinct devices.” ’322

¹¹ The “combined model claims” are dependent claims 2, 12, 23 and 33 of the ’115 patent.

patent at 8:25-27, 42-44 (emphasis added). Combining two data sets is nothing more than an abstract idea. *See, e.g., Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014). The two models and resulting combined model are therefore ineligible subject matter. *Id.* The location where models are built is merely a “‘generic environment’ in which to carry out the well-known and abstract idea” of building a model. *Intellectual Ventures*, 838 F.3d at 1320.

The application community claims additionally recite notifying members of a community running the same program or a selected portion of the program of the identified anomaly.¹² Dkt. 123 at 2. This additional limitation does not make these claims any less abstract. *See Elec. Power Grp.*, 830 F.3d at 1354 (stating “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation), is abstract as an ancillary part of such collection and analysis”); *FairWarning IP*, 839 F.3d at 1094-1098. Thus the application community claims are abstract as an ancillary part of the abstract idea of identifying deviations in data.¹³

The “indicators of program-level function calls” also do not render the indicator claims any less abstract.¹⁴ Claim 23 that depends on Claim 22 (now invalid) of the ’115 patent is illustrative.

22. A method for detecting anomalous program executions, comprising:

modifying a program to include *indicators of program-level* function calls being made during execution of the program;

¹² The “application community claims” are dependent claims 2, 9, 10, 12, 19 and 20 of the ’115 patent.

¹³ *See also Intellectual Ventures II LLC v. JP Morgan Chase & Co.*, 2015 WL 1941331, at *15-16 (S.D.N.Y. Apr. 28, 2015).

¹⁴ The “indicator claims” are dependent claims 23, 30, 31, 33, 40 and 41 of the ’115 patent.

comparing at least one of the *indicators of program-level* function calls made in an emulator to a model of function calls for at least a part of the program; and

identifying a function call corresponding to the at least one of the *indicators* as anomalous based on the comparison.

23. The method of claim 22, further comprising creating a **combined model** from at least two models created using different computers.

'115 patent at 21:50-62 (emphasis added).

Concluding the indicator claims are not abstract would conflict with the Federal Circuit's holding in *Intellectual Ventures*. See *Intellectual Ventures I*, 838 F.3d at 1314 (characterizing materials "based on a known list of identifiers" as an abstract idea).

Finally, the dependent random model claims do not change the basic abstract character of the asserted claims.¹⁵ These claims additionally recite a variation of "randomly selecting [[at least] a portion of] the model as to be used in the comparison [from a plurality of different models relating to the program]." The specification states that random model building can be controlled using a key "provided by a commercial off-the-shelf (COTS) software vendor or **some other data providing 'randomization.'**" '322 patent at 7:7-10 (emphasis added). Randomly selecting a model for comparison is an abstract idea in itself, and adding this idea to the claim limitations above is simply an unpatentable combination of abstract ideas. Indeed, the Federal Circuit and this Court have repeatedly held that the mere combination of abstract processes is insufficient to bring the claims at issue out of the realm of the abstract. See *Consumer 2.0, Inc. v. Tenant Turner, Inc.*, 343 F. Supp. 3d 581, 590-591 (E.D. Va. 2018) citing *Elec. Power Grp.*, 830 F.3d at 1354 and *Asghari-Kamrani v. United Servs. Auto. Ass'n*, 2016 WL 3670804, at *4 (E.D.

¹⁵ The "random model claims" are dependent claims 9, 10, 19, 20, 30, 31, 40, 41 of the '115 patent and 8, 17, 25 of the '322 patent.

Va. July 5, 2016) (emphasis added) (“finding that combining the abstract ideas of ‘using of a third party intermediary and **a random, time-sensitive code** to confirm the identity of a participate to a transaction’ was insufficient to ‘remove[] the patent claims from the realm of the abstract’”).

2. The asserted claims can be performed manually.

The abstract nature of the asserted claims is further confirmed by the fact that the claimed invention can be performed by human activity alone. The Federal Circuit has distinguished certain claims that are “directed to an improvement to computer functionality” from certain claims that are “directed to an abstract idea.” *Enfish*, 822 F.3d at 1335. Here the claims are plainly in the latter category. An individual can manually compare a function call to function calls made by a program. So, too, can an individual identify when a function call is not like the function calls made by a program. For example, a function name may be pulled from a program. ’322 patent at 3:40-42. There are circumstances in which it would be readily apparent to a skilled antivirus researcher that a function call is unlike those normally made by a program.

The anomaly detection algorithm for comparing and identifying anomalies can be any suitable algorithm. *Id.* at 3:16-19. But even if the algorithms were limited to PAD or OCSVM, these too are solvable manually. *Id.* at 4:10-6:10. The specification even admits that a “human operator” can manually carry out the claimed invention.

Further, the manipulations performed are often referred to in terms, such as adding or **comparing, which are commonly associated with mental operations performed by a human operator. No such capability of a human operator is necessary, or desirable in many cases**, in any of the operations described herein in connection with various embodiments; the operations are machine operations. **Useful machines** for performing the operation of various embodiments include **general purpose digital computers or similar devices**.

Id. at 19:37-45 (emphasis added).

As mentioned earlier, the Supreme Court and Federal Circuit have repeatedly held that “analyzing information ... by mathematical algorithms, without more” is within the realm of abstract ideas. *Elec. Power Grp.*, 830 F.3d at 1354 citing cases, including *Parker v. Flook*, 437 U.S. 584, 98 S. Ct. 2522 (1978), and *Gottschalk v. Benson*, 409 U.S. 63, 93 S. Ct. 253 (1972).¹⁶ Thus, one can manually perform the steps or functions claimed in each of the asserted claims, further confirming their abstract nature.

B. Nothing in the Asserted Claims Adds an Inventive Concept to the Underlying Abstract Idea.

Because they are directed to patent-ineligible subject matter, the asserted claims of the ’115 and ’322 patents are invalid unless they contain an “inventive concept.” *Alice*, 134 S. Ct. at 2355 quoting *Mayo*, 132 S. Ct. at 1294. In applying the second step of *Alice*, this Court must determine “what else is there in the claims before us?” *Id.* The Court must consider the additional claim elements beyond the abstract idea “individually” and “as an ordered combination.” *BSG*, 899 F.3d at 1289-90. These additional elements must supply an inventive concept that ensures the patent amounts to “significantly more” than a patent on the abstract idea itself. *Id.* at 1290. It is not enough to disclose the improvement in the specification; instead, the Court's task becomes to “analyze the asserted claims and determine whether **they capture these improvements.**” *Berkheimer*, 881 F.3d at 1369 (emphasis added). In other words, “[t]o save a

¹⁶ See also *PUREPREDICTIVE, Inc. v. H2O.AI, Inc.*, 2017 WL 3721480 at *5 (N.D. Cal. Aug. 29, 2017) *aff'd sub nom. Purepredictive, Inc. v. H2O.ai, Inc.*, 741 F. App'x 802 (Fed. Cir. 2018) (emphasis added) (stating that “[t]he first step, **generating learned functions or regressions from data**—the basic mathematical process of, for example, regression modeling, or running data through an algorithm—is not a patentable concept” and the next steps, **evaluating the effectiveness of those learned functions and selecting the most effective learned functions, were similarly abstract**).

patent at step two, an inventive concept **must be evident in the claims.**” *RecogniCorp*, 855 F.3d at 1327 (emphases added).

Here the claimed invention is recited in high-level, general terms using purely functional language. Every step of the method claims and every component of the apparatus claims is routine and conventional in the art, as demonstrated by the language in the ’115 and ’322 patent specification. The asserted claims simply do not contain an inventive concept.

1. The result-oriented, functional language of the asserted claims is a plain signal that the claims lack an inventive concept.

The asserted claims are drafted in purely functional terms and recite nothing beyond the abstract idea itself. *Elec. Power Grp.*, 830 F.3d at 1351 (stating “claims, defining a desirable information-based result and not limited to inventive means of achieving the result, fail under § 101”). Nothing in these claims restricts *how* the result is accomplished—merely identifying a deviation in data based on a comparison. Claims that are result-focused using functional language is a frequent feature of claims held ineligible. *Id.* at 1355.

Turning to the claim language, Claim 2 of the ’322 patent recites three high-level functions: executing a program in an emulator, comparing a function call made in the emulator to a model of function calls, and identifying the function call as anomalous based on the comparison. This claim is carried out using two generic computing components—an “emulator” and “different computers” performing routine functions. Such “invocations of computers ... are not even arguably inventive.” *Elec. Power Grp.*, 830 F.3d at 1355. Claim 2 of the ’322 patent is shown below.

2 [pre]. A method for detecting anomalous program executions, comprising:

[a] executing at least a portion of a program in an **emulator;**

[b] comparing a function call made in the emulator to a model of function calls for the at least a portion of the program,

wherein the model is a combined model created from at least two models created using **different computers**; and

[c] identifying the function call as anomalous based on the comparison.

'322 patent at 20:47-55 (emphasis added).

An emulator is *any* “[s]oftware, alone or in combination with hardware, that permits the monitoring and selective execution of certain parts, or all, of a program.” Dkt. 123 at 2. And it performs a routine function in the Executing Step, “executing at least a portion of a program.” This is simply a generic component being used for its intended purpose. In the Comparing Step, a function call is compared to a model of function calls. Like the combined model claims of the '115 patent, this claim additionally recites using a combined model created from at least two models using different computers. Here the second generic component, “different computers,” is used to create a combined model for the model of function calls. Creating a combined model is a routine function, as confirmed by the patent specification. '322 patent at 8:25-27, 42-44 (emphasis added) (“a newly created model can be **algorithmically combined** with the older model using **any of a variety of suitable means**” and that “two distinct models may be computed by two distinct instances of an application by two distinct devices”).¹⁷

This claim, however, does not recite *how* any of these steps are performed. *See supra*. For instance, the claim says nothing about how to execute a program, how to compare function calls, how a combined model is created by different computers/at different times, or how an

¹⁷ *See also, e.g., Id.* at 8:33-37 (emphasis added) (“Two independently learned PAD models can thus have two different counts for the same value, and a new frequency table **can be readily computed by summing the two counts**, essentially merging two tables and updating common values **with the sum of their respective counts**”).

anomaly is identified. Rather, the claimed steps are directed solely to the result: executing at least a portion of a program (somehow); comparing function calls (in some way) using a combined model (somehow); and identifying an anomaly (in some manner).

Like Claim 2 of the '322 patent, the remaining asserted claims recite the same high-level functions in similar result-oriented, functional language. The application community claims of the '115 patent additionally recite “notifying an application community that includes a plurality of computers of the anomalous function call.” These claims do not specify *how* the application community is notified of the anomaly and instead, are directed to the result of notifying the application community (in some way). *See FairWarning IP*, 839 F.3d at 1094-1098. The indicator claims of the '115 patent additionally include “indicators of program-level function calls.” These claims do not specify how a program is modified to include indicators of program-level function calls, how the indicators are compared, or how they are identified as anomalous. Rather, the indicator claims are directed to the result of these functions using indicators of program-level function calls.

Lastly, the random model claims additionally recite a variation of “randomly selecting [[at least] a portion of] the model as to be used in the comparison [from a plurality of different models relating to the program].” These claims do not specify *how* a random model is selected and instead, are directed to the result of using a random model (somehow).

Simply put, there is nothing in the asserted claims “directed to *how* to implement” the idea of identifying a deviation in data based on a comparison. *Affinity Labs*, 838 F.3d at 1258. Taken together or individually, the elements of the asserted claims are a far cry from improving computer functionality because *any* algorithm, *any* software, or *any* hardware can be used. Hence the asserted claims are merely drawn to the idea itself and lack an inventive step.

V. CONCLUSION

The asserted claims of the '115 and '322 patents are directed to the abstract idea of identifying deviations in data. The claims implement this idea with purely functional language and wholly generic components. The '115 and '322 patents are therefore invalid for lack of patentable subject matter, and Symantec's Motion for Judgment on the Pleadings should be granted.

Respectfully submitted,

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CERTIFICATE OF SERVICE

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